

CLAIMS

1. A super light weight ceramic panel comprising a multiplicity of closed pore structures produced by trapping carbon dioxide gas generated via oxidation of silicon carbide and oxygen gas generated via reduction of iron oxide within a vitreous phase produced by expandable clay mineral and glass.
2. The panel according to claim 1, wherein the closed pore has a pore density of 343 to 1000 pores/cm³.
3. The panel according to claim 1, wherein the closed pore has a pore volume of 74 to 89%, relative to the total volume of the panel.
4. The panel according to claim 1, wherein the ceramic panel has a water permeability of 0 to 5%.
5. The panel according to claim 1, wherein the ceramic panel has a density of 0.3 to 0.7 g/cm³.
6. The panel according to claim 1, wherein the ceramic panel has flame retardancy grade 1 pursuant to KS F 2271.
7. The panel according to claim 1, wherein the ceramic panel has a linear expansion rate of 13.8 to 40.2%.
8. The panel according to claim 1, wherein the ceramic panel has a flexural strength of 8 to 50 kgf/cm².
9. The panel according to claim 1, wherein the ceramic panel has a far infrared radiation rate of 0.90 to 0.93 and a far infrared radiation energy of 350 to 400 W/m².
10. The panel according to claim 1, wherein the ceramic panel has a thermal conductivity of 0.10 to 0.13 W/m · K.

11. The panel according to claim 1, wherein the ceramic panel has a bending strength of 40 to 80 kgf/cm².

5 12. The panel according to claim 1, wherein the ceramic panel consists of a composition containing 90 to 98% by weight of an expandable clay mineral, 1 to 5% by weight of glass, and 0.5 to 5% by weight of silicon carbide.

10 13. The panel according to claim 12, wherein the expandable clay mineral contains 61.5 to 70% by weight of SiO₂, 15 to 20% by weight of Al₂O₃, 1 to 5% by weight of Fe₂O₃, 2 to 4% by weight of CaO, 1 to 3% by weight of MgO, 0.5 to 1.5% by weight of K₂O and 2 to 5% by weight of Na₂O.

15 14. The panel according to claim 1, wherein the panel has a sandwich structure by attaching steel plates to both top and bottom sides of the ceramic panel.

20 15. The panel according to claim 14, wherein an adhesive used in adhesion between the ceramic panel and the steel plate is selected from an epoxy adhesive, an urethane adhesive, an ethylene vinyl acetate (EVA) adhesive and mixtures thereof.

25 16. The panel according to claim 1, wherein a protrusion is formed on one side of the ceramic panel and a groove is formed on the opposite side thereof and two adjacent ceramic panels are assembled via coupling between the protrusion and the groove.

17. A process for preparing a super light weight ceramic panel, comprising the steps of:
30 mixing 90 to 98% by weight of an expandable clay mineral, 1 to 5% by weight of glass and 0.5 to 5% by weight of silicon carbide;
pressing the resulting mixture to form a panel; and
firing and foaming the panel.

35 18. The process according to claim 17, wherein firing and foaming are carried out at a temperature of 1100 to 1200 °C.

19. The process according to claim 17, wherein in the firing and foaming steps, firing time is in the range of 20 minutes to 24 hours, and holding time is in the range of 1 minute to 1 hour.